

### Section III. REMARKS

#### Withdrawal of Claims 1-31 and 63-65 in Response to Restriction Requirement

In the December 12, 2003 Office Action, the Examiner imposed a restriction requirement against claims 1-68 and required that an election be made between:

- Group I: Claims 1-31 and 63-65, drawn to an *in-situ* generation system of fluorine radicals and/or fluorine-containing interhalogen compounds for use in cleaning a processing chamber and a system for generating fluorine radicals and/or fluorine-containing interhalogen compounds, classified in class 422, subclass 186.3; and
- Group II: Claims 32-62 and 66-68, drawn to method for *in-situ* generation of fluorine radicals and/or fluorine-containing interhalogen compounds for use in cleaning a processing chamber, a method of generating chlorine trifluoride and a method for generating fluorine radicals and/or fluorine-containing interhalogen compounds, classified in class 204, subclass 157.48.

**Applicants hereby affirm the prior provisional election** made by Margaret Chappuis during a telephone conversation with Examiner Wong on December 4, 2003, **of the Group II claims.**

Consistent with such prior election and present affirmation, the non-elected Group I claims 1-31 and 63-65 have been withdrawn herein.

The pending claims under consideration in the application therefore are claims 32-46, 48-53, 55-62 and 66-70.

#### Amendment of Claims 32, 33, 39, 48-53, 55, 56, 59 and 66 and Addition of Claims 69 and 70

Claim 32 has been amended to recite, *inter alia*:

**“A method for *in-situ* generation of fluorine radicals and/or fluorine-containing interhalogen compounds for use in cleaning a processing chamber, comprising the steps of:**

- (a) providing a fluorine source for supplying fluorine gas;**
- (b) providing a halogen source for supplying at least one halogen species selected from the group consisting of Cl<sub>2</sub>, Br<sub>2</sub>, and I<sub>2</sub>;**

wherein said method is characterized by at least one of the following sequences (I), (II), (III) and (IV) of steps:

- (I)
  - (i) flowing the fluorine gas and the halogen species from said respective sources therefor into a processing chamber communicatively connected with said sources, without any intervening holdup of said fluorine gas and halogen species between the respective sources and the processing chamber; and
  - (ii) generating the fluorine radicals and/or fluorine-containing interhalogen compounds by introducing external energy from an energy source into the processing chamber containing the fluorine gas and the halogen species;
- (II)
  - (i) providing a diluent gas source for supplying at least one inert gas;
  - (ii) flowing the fluorine gas and the halogen species into a processing chamber communicatively connected with the fluorine source and the halogen source;
  - (iii) generating the fluorine radicals and/or fluorine-containing interhalogen compounds by introducing external energy from an energy source into the processing chamber containing the fluorine gas and the halogen species; and
  - (iv) flowing the diluent gas into the processing chamber to dilute the fluorine radicals and/or fluorine-containing interhalogen compounds contained therein;
- (III)
  - (i) flowing the fluorine gas and the halogen species into a processing chamber communicatively connected with the fluorine source and the halogen source; and
  - (ii) generating the fluorine-containing interhalogen compounds by introducing external energy from an energy source into the processing chamber containing the fluorine gas and the halogen species, wherein the fluorine-containing interhalogen compounds have a general formula  $\text{XF}_n$ , and wherein  $\text{X} = \text{Cl}, \text{Br}, \text{or I}$ , and  $n = 1, 3, 5, \text{ or } 7$ , with the proviso that when  $\text{X} = \text{Cl}$ ,  $n$  is 3, 5 or 7; or
- (IV)
  - (i) flowing the fluorine gas and the halogen species into a mixing chamber communicatively connected with the fluorine source and the halogen source;

- (ii) generating the fluorine radicals and/or fluorine-containing interhalogen compounds by introducing external energy from an energy source into the mixing chamber containing the fluorine gas and the halogen species;**
- (iii) flowing the generated fluorine radicals and/or fluorine-containing interhalogen compounds from the mixing chamber into a holding chamber for storage until a pre-determined pressure threshold is reached; and**
- (iv) flowing the generated fluorine radicals and/or fluorine-containing interhalogen compounds from the holding chamber into the processing chamber to effect cleaning therein.”**

Support for the recital of sequences I-IV can be found in the instant application at paragraph [0023], paragraph [0031], paragraph [0015], and paragraphs [0026] - [0028], respectively.

Claim 66 has been amended to recite:

- “[a] method for generating fluorine radicals and/or fluorine-containing interhalogen compounds, comprising the steps of**
- (i) providing a fluorine source for supplying fluorine gas;**
  - (ii) providing a halogen source for supplying at least one halogen species other than fluorine;**
  - (iii) providing a diluent source for supplying a relatively inert gas;**
  - (iv) mixing fluorine with said halogen species in an enclosure;**
  - (v) supplying photoenergy to said enclosure from a photoenergy source to facilitate generation of the fluorine radicals and/or fluorine-containing interhalogen compounds; and**
  - (vi) supplying the inert gas to the enclosure to dilute the generated fluorine radicals and/or fluorine-containing interhalogen compounds.”**

Support for this amendment can be found in the instant application at paragraph [0031].

Claims 32, 39 and 66 have been amended to obviate the §112, second paragraph, rejection, as discussed more fully hereinafter.

Claims 48-53, 55 and 56 have been amended to change the number of the claim on which such claims 48-53, 55 and 56 depend.

Claims 69 and 70 have been added herein. Support for new claims 69 and 70 can be found in the instant specification at paragraphs [0031], [0015], and [0026] - [0028].

### **Rejection of Claims and Traversal Thereof**

In the December 12, 2003 Office Action:

claims 23-60 and 66-68 were rejected under 35 U.S.C. §112, second paragraph;

claims 32-35, 38, 41-42, 46-49, 51, 54, 57, 59-61 and 66-68 were rejected under 35 U.S.C. §102(b) as being anticipated by JP 2001-189273;

claims 36-37, 39-40, 43-45, 50, 52-53, 55, 58 and 62 were rejected under 35 U.S.C. §103(a) as being unpatentable over JP 2001-189273; and

claim 56 was rejected under 35 U.S.C. §103(a) as being unpatentable over JP 2001-189273 in view of JP 2001-267241.

These various rejections are traversed and reconsideration of the patentability of the claims is requested in light of the following remarks.

### **Rejection Under 35 U.S.C. §112, second paragraph**

In the December 12, 2003 Office Action, claims 32-60 and 66-68 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention, on the following grounds.

1. Claims 32, 39, 47, 59 and 66 were rejected under 35 U.S.C. §112, second paragraph as indefinite, on the basis that the term “the” should be inserted prior to the subsequent recital of the antecedently supported term “fluorine radicals and/or fluorine-containing interhalogen compounds.”

It is noted that claim 47 has been canceled herein.

In response to the §112, second paragraph rejection, applicants have amended claims 32, 39 and 66 according to the Examiner's suggestion to include the term "the" prior to the additional recitals of the term "fluorine radicals and/or fluorine-containing interhalogen compounds."

Applicants traverse the §112, second paragraph rejection of claim 59, which already includes the term "the" prior to the additional recital of the term "fluorine radicals and/or fluorine-containing interhalogen compounds."

Withdrawal of the rejection of claims 32, 39, 59 and 66 therefore is requested.

2. Claims 32-60 were rejected under 35 U.S.C. §112, second paragraph, as being incomplete for omitting essential steps, amounting to a gap between the steps. In response, applicants have amended claim 32, upon which claims 33-60 directly or indirectly depend, to recite, *inter alia*:

**"generating the fluorine radicals and/or fluorine-containing interhalogen compounds by introducing external energy from an energy source into the processing chamber containing the fluorine gas and the halogen species."** (emphasis added)

In light of the foregoing, applicants respectfully request withdrawal of §112, second paragraph rejections of claims 32-60 and 66-68.

#### **§102(b) Rejection Based on JP 2001-189273**

In the December 12, 2003 Office Action, claims 32-35, 38, 41-42, 46-49, 51, 54, 57, 59-60, 61 and 66-68 were rejected under 35 U.S.C. §102(b) as being anticipated by JP 2001-189273 (hereinafter "JP `273").

Applicants traverse such rejection.

JP `273 teaches the introduction of fluorine gas and chlorine gas into a preliminary reactor for the thermal or radiative generation of chlorine radicals, fluorine radicals, ClF molecules and ClF radicals ("the reactive species"), followed by passage of the reactive species from the preliminary reactor to a semiconductor processing chamber for cleaning therein. Thus, the reactive species are generated before entering the semiconductor processing chamber.

With respect to the §102(b) rejection of claims 32-35, 38, 41-42, 46-49, 51, 54, 57 and 59-60, claim 32 has been amended herein and is characterized by at least one of four recited sequences of steps. Each characterizing sequence is distinguished from JP `273 hereinbelow.

#### Sequence I

Sequence I of claim 32 recites, *inter alia*:

**“(i) flowing the fluorine gas and the halogen species from said respective sources therefor into a processing chamber communicatively connected with said sources, without any intervening holdup of said fluorine gas and halogen species between the respective sources and the processing chamber . . ..”** (emphasis added)

JP `273 does not teach or suggest the introduction of fluorine gas and halogen species into the processing chamber, without any intervening holdup of said gases between their respective gas sources and the processing chamber, for generation of fluorine (F) radicals and/or fluorine-containing interhalogen (hereinafter  $\text{XF}_n$ ) compounds therein.

Instead, JP `273 describes the prior art practice of introducing the interhalogen  $\text{ClF}_3$  directly into the interior of a CVD system (see JP `273, paragraph [0005]), NOT fluorine gas and halogen species for reaction therein, as recited by applicants in Sequence I of claim 32. Furthermore, JP `273 teaches the generation of reactive species in the preliminary reactor before passage of said reactive species to the semiconductor processing chamber. As such, Sequence I of applicants' claimed invention is not anticipated by the JP `273 reference.

Notably, JP `273 disparages applicants' claimed invention, wherein the F radicals and/or  $\text{XF}_n$  compounds are generated within the processing chamber. For example, JP `273 recites:

**“Moreover, when cleaning, when the source of plasma was prepared in a reaction chamber . . . it became a pollution source to the semiconductor wafer laid in the interior, and had become the cause of a fall of the reliability of the device.”** (see JP `273, , paragraph [0009]) (emphasis added)

As such, not only is Sequence I of applicants' claimed invention not anticipated by JP `273, but JP `273 actually teaches away from going in the direction of Sequence I of applicants' claimed invention by

stating that when the cleaning gases are generated within the processing chamber, they act as a pollution source, thereby discouraging one skilled in the art from going in the direction of applicants' claimed invention.

## Sequence II

Sequence II of claim 32 recites, *inter alia*:

- “(i) **providing a diluent gas source** for supplying at least one inert gas;
- (ii) **flowing the fluorine gas and the halogen species into a processing chamber communicatively connected with the fluorine source and the halogen source;**
- (iii) **generating the fluorine radicals and/or fluorine-containing interhalogen compounds by introducing external energy from an energy source into the processing chamber containing the fluorine gas and the halogen species; and**
- (iv) **flowing the diluent gas into the processing chamber to dilute the fluorine radicals and/or fluorine-containing interhalogen compounds contained therein . . .**” (emphasis added)

The inert gas is added to minimize the risk of over-pressurizing the processing chamber during cleaning, which could lead to fluctuation of internal pressure or rupture of the process chamber (see instant specification, paragraph [0031], lines 4-9).

According to the Examiner, JP `273 teaches “supplying an inert gas from a diluent gas source **4c** to dilute the generated fluorine radicals and/or fluorine-containing interhalogen compounds” (see December 12, 2003 Office Action, page 8, lines 12-14).

Applicants vigorously disagree.

JP `273 does not teach or suggest the introduction of a diluent gas source into the processing chamber while the F radicals and/or  $\text{XF}_n$  compounds are contained therein.

Instead, JP `273 teaches **purging** the preliminary reactor 5 of the reactive gases upon completion of the cleaning of reaction chamber 8 (see JP `273, paragraph [0050], steps (7) and (8)). For ease of reference, Figure 1 of JP `273 has been recreated hereinbelow.

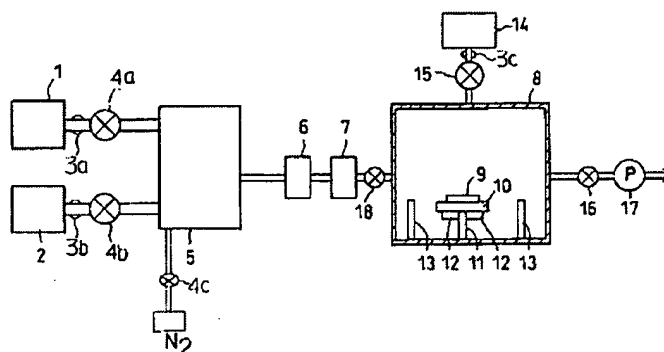


Fig. 1 of JP `273

Specifically, the preliminary reactor 5 is purged following cleaning of processing chamber 8 and the closing of valves 18, 4a and 4b, by opening valve 4c (see JP `273, paragraph [0050], step (8)). Contrary to the Examiner's contention, the purging process of JP `273 is not equivalent to "dilut[ing] the generated fluorine radicals and/or fluorine-containing interhalogen compounds" as claimed by applicants herein. Instead, the inert gas is used strictly to purge the preliminary reactor 5 after the cleaning of the processing chamber 8 has ceased.

Accordingly, the purging process recited in JP `273 does not anticipate applicants' claimed invention, wherein diluent gas is introduced to the processing chamber while the F radicals and/or  $\text{XF}_n$  compounds are present therein.

### Sequence III

Sequence III of claim 32 recites, *inter alia*:

**“(ii) generating the fluorine-containing interhalogen compounds by introducing external energy from an energy source into the processing chamber containing the fluorine gas and the halogen species, wherein the fluorine-containing interhalogen compounds have a general formula  $\text{XF}_n$ , and wherein  $\text{X} = \text{Cl}, \text{Br}, \text{or I}$ , and  $n = 1, 3, 5, \text{or } 7$ , with the proviso that when  $\text{X} = \text{Cl}$ ,  $n$  is 3, 5 or 7 . . .”**  
(emphasis added)



JP `273 does not teach or suggest fluorine-containing interhalogen compounds having the general formula  $XF_n$ , wherein  $X = Cl, Br$  or  $I$  and  $n = 1, 3, 5$  or  $7$ , with the proviso that when  $X = Cl$ ,  $n$  is  $3, 5$  or  $7$ . For example, JP `273 recites that the cleaning gas contains  $Cl$  (radical),  $F$  (radical), a  $ClF$  molecule and  $ClF$  (radical) (see JP `273, paragraph [0060]).

Moreover, the Examiner inherently admits that the only fluorine-containing interhalogen compound disclosed in JP `273 is  $ClF$  (see December 12, 2003 Office Action, page 6, lines 15-16 and 18-19, wherein the Examiner listed only  $ClF$  as the  $XF_n$  compound listed in JP `273). This underscores the fact that JP `273 does not teach or suggest the formation of the  $XF_n$  compounds claimed by applicants herein.

As such, Sequence III of applicants' claimed invention is not anticipated by the JP `273 reference.

#### Sequence IV

Sequence IV of applicants' claim 32 recites, *inter alia*:

- “(i) flowing the fluorine gas and the halogen species into a mixing chamber communicatively connected with the fluorine source and the halogen source;
- (ii) generating the fluorine radicals and/or fluorine-containing interhalogen compounds by introducing external energy from an energy source into the mixing chamber containing the fluorine gas and the halogen species;
- (iii) flowing the generated fluorine radicals and/or fluorine-containing interhalogen compounds from the mixing chamber into a holding chamber for storage until a pre-determined pressure threshold is reached; and
- (iv) flowing the generated fluorine radicals and/or fluorine-containing interhalogen compounds from the holding chamber into the processing chamber to effect cleaning therein.” (emphasis added)

Flowing the generated  $F$  radicals and/or  $XF_n$  compounds into a holding chamber allows immediate gas flow to the processing chamber on demand and shortens the waiting period associated with generation startup or reaction initialization (see instant specification, paragraph [0028], lines 3-7).

According to the Examiner, JP `273 teaches the step of flowing the formed F radicals and/or  $\text{XF}_n$  compounds into a holding chamber positioned between said mixing chamber and said processing chamber (see December 12, 2003 Office Action, page 8, lines 5-8).

Applicants vigorously disagree.

Contrary to the Examiner's contention, the purifier 6<sup>1</sup> of JP `273 is NOT a holding chamber. As is known in the art, a purifier is a filtration unit that ensures that certain species do not continue upstream of the purifier. The main stream of gas flows through the purifier, and only the impurity species removed in the purifier stay behind.

In contrast to JP `273, Sequence IV of applicants' claimed invention requires a holding chamber wherein the generated cleaning gases are stored in the holding chamber until a pre-determined pressure threshold is reached.

As such, applicants' claimed invention, wherein a holding chamber is interposed between a mixing chamber and the processing chamber, is not anticipated by JP `273.

Considered *in toto*, applicants respectfully request withdrawal of the §102 rejection based on JP `273, of claim 32, and claims 33-35, 38, 41-42, 46-49, 51, 54, 57 and 59-60 directly or indirectly dependent thereunder.

Claim 61 was also rejected as being anticipated by JP `273. According to the Examiner, JP `273 teaches a method of generating chlorine trifluoride ( $\text{ClF}_3$ ).

Applicants vigorously disagree.

By the Examiner's own admission, JP `273 only teaches the formation of the interhalogen compound ClF (see December 12, 2003 Office Action, page 6, lines 15-16 and lines 18-19), NOT the compound  $\text{ClF}_3$ . Thus, JP `273 does not anticipate the subject matter recited in applicants' claim 61.

Lastly, claims 66-68 were rejected as being anticipated by JP `273.

---

<sup>1</sup> See JP `273 abstract for properly translated term for reference number 6.

Claim 66 relates to a method for generating fluorine radicals and/or fluorine-containing interhalogen compounds, which recites *inter alia*:

**“(vi) supplying the inert gas to the enclosure to dilute the generated fluorine radicals and/or fluorine-containing interhalogen compounds.”** (emphasis added)

As discussed hereinabove, JP `273 does not teach or suggest the introduction of an inert gas into the processing chamber/enclosure while the F radicals and/or  $\text{XF}_n$  compounds are contained therein.

Instead, JP `273 teaches **purging** the preliminary reactor 5 of the reactive gases upon completion of the cleaning of reaction chamber 8. Clearly, JP `273, which teaches purging, does not teach or suggest “dilut[ing] the generated fluorine radicals and/or fluorine-containing interhalogen compounds,” as claimed by applicants herein.

Accordingly, applicants’ claim 66 is not anticipated by JP `273. Applicants therefore respectfully request withdrawal of the §102 rejection of claim 66, and claims 67-68 dependent thereunder.

#### **§103(a) Rejection of Claims 36-37, 39-40, 43-45, 50, 52-53, 55, 58 and 62 Based on JP `273**

In the December 12, 2003 Office Action, claims 36-37, 39-40, 43-45, 50, 52-53, 55, 58 and 62 were rejected under 35 U.S.C. §103(a) as being unpatentable over JP `273.

Applicants traverse such rejection.

As introduced hereinabove, JP `273 does not teach or suggest every limitation of applicants’ claim 32, and claims 36-37, 39-40, 43-45, 50, 52-53, 55 and 58, directly or indirectly dependent thereunder. For ease of reference, each characterizing sequence of claim 32 is distinguished from JP `273 hereinbelow.

#### **Sequence I**

As discussed above, JP `273 teaches away from going in the direction of applicants’ claimed invention, wherein the F radicals and/or  $\text{XF}_n$  compounds can be generated within the processing chamber.

As such, Sequence I of applicants’ claim 32 is nonobvious over JP `273.

## Sequence II

As previously discussed, JP `273 discloses the use of an inert gas to purge the preliminary reactor following cleaning of the reaction chamber.

In contrast, Sequence II of applicants' claim 32 requires the inclusion of a diluent gas into the processing chamber to dilute the F radicals and/or  $\text{XF}_n$  compounds contained therein.

As such, JP `273 fails to teach or suggest every limitation of option II of applicants' claimed invention.

Further, JP `273 does not motivate one of ordinary skill in the art to modify the disclosure thereof in any way that would yield applicants' claimed invention. The Examiner is respectfully reminded that in order to make a legally sufficient rejection based on a modification of the reference disclosure, the areas of the reference that suggest the modification must be explained with specificity. See, *Ex parte Humphreys*, 24 U.S.P.Q.2d 1255, 1262 (B.P.A.I. 1992). The Examiner may not reconstruct applicants' claimed invention in light of applicants' own disclosure, without any suggestive basis in the prior art reference itself.

Accordingly, JP `273 fails to disclose or suggest every limitation of Sequence II of applicants' claim 32. Further, there is no motivation or suggestion to modify the JP `273 reference. As such, Sequence II of applicants' claim 32 is nonobvious over the JP `273 reference.

## Sequence III

Sequence III of applicants' claim 32 relates to the generation of fluorine-containing interhalogen compounds having a general formula  $\text{XF}_n$ , wherein X = Cl, Br or I and n = 1, 3, 5 or 7, with the proviso that when X = Cl, n is 3, 5 or 7.

By the Examiner's own admission, JP `273 only teaches the formation of the interhalogen compound ClF (see December 12, 2003 Office Action, page 6, lines 15-16 and 18-19). As such, JP `273 fails to teach or suggest every limitation of applicants' claimed invention.

Further, there is no motivation or suggestion in JP `273 to use the fluorine-containing interhalogen compounds enumerated in Sequence III of applicants' claim 32.

In fact, JP `273 disparages the use of more highly fluorinated ClF<sub>n</sub> compounds, such as ClF<sub>3</sub>, in the discussion of the prior art. As recited in JP `273:

“although reactively was very highly suitable for cleaning when ClF<sub>3</sub> was chosen as cleaning gas, cautions were required for handling, such as piping, selection of a sealing compound, and mixed prevention with other gas . . . Moreover, when cleaning, when the source of plasma was prepared in a reaction chamber . . . it became a pollution source to the semiconductor wafer laid in the interior, and had become the cause of a fall of the reliability of the device.” (see JP `273, paragraph [0007], lines 2-4 and paragraph [0009], lines 1-3) (emphasis added)

As such, one skilled in the art reading the JP `273 reference would not be motivated to utilize a species such as ClF<sub>3</sub> to clean the interior of a semiconductor processing chamber, because JP `273 teaches that ClF<sub>3</sub> usage requires substantial handling precautions and is a pollution source within the semiconductor processing chamber.

Accordingly, JP `273 fails to disclose or suggest every limitation of Sequence III of applicants' claim 32. Further, there is no motivation or suggestion to modify the JP `273 reference. As such, Sequence III of applicants' claim 32 is non-obvious over the JP `273 reference.

#### Sequence IV

As discussed hereinabove, Sequence IV of applicants' claim 32 recites the inclusion of a holding chamber between a mixing chamber and the processing chamber. The F radicals and/or XF<sub>n</sub> compounds are generated in the mixing chamber, then stored in the holding chamber until a pre-determined pressure threshold is reached, followed by release from the holding chamber into the processing chamber to effect cleaning therein.

JP `273 does not teach or suggest every limitation of Sequence IV of applicants' claim 32, including the holding chamber positioned between the mixing chamber and the processing chamber.

Instead, JP `273 teaches the placement of purifiers and filters between the mixing chamber and processing chamber. Clearly, purification and holding chambers are not analogous technologies.

Moreover, there is no motivation or suggestion to modify the JP `273 reference. Considered as a whole, the JP `273 purifier will actually reduce the number of reactive molecules, i.e., reduce the pressure,

available upstream of the purifier. Clearly, this effect is contrary to applicants' claimed invention, wherein the holding chamber is used to increase the number of reactive molecules, i.e., increase the pressure, upstream of the holding chamber when immediate reactive gas flow is required.

As such, JP `273 fails to disclose or suggest all the recited features of Sequence IV of applicants' claim 32. Further, there is no motivation or suggestion to modify JP `273.

Therefore, considered *in toto*, applicants' claim 32, and claims 36-37, 39-40, 43-45, 50, 52-53, 55 and 58 dependent thereunder, are nonobvious over the JP `273 reference.

Applicants respectfully request withdrawal of the §103 rejection of claims 36-37, 39-40, 43-45, 50, 52-53, 55 and 58 based on JP `273.

Claim 62 was also rejected as being unpatentable over JP `273. Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness.

By the Examiner's own admission, JP `273 does not teach flowing the fluorine gas and chlorine gas from said gas sources into a processing chamber (see December 12, 2003 Office Action, page 17, lines 1-2) or the formation of the interhalogen compound ClF<sub>3</sub> (see December 12, 2003 Office Action, page 6, lines 15-16 and 18-19), as claimed herein in applicants' claim 62.

In fact, as discussed hereinabove, JP `273 teaches away from flowing the unreacted gases into the processing chamber for reaction therein AND discourages the use of ClF<sub>3</sub> as a cleaning gas because of the precautions required for handling and because it is a source of pollution in the reaction chamber.

Since the recited features of applicants' claimed invention are not disclosed or suggested in the JP `273 reference, applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness.

As such, applicants respectfully request withdrawal of the rejection of claim 62 under 35 U.S.C. §103(a) over JP `273.

**§103(a) Rejection of Claim 56 Based on JP `273, and further in view of JP 2001-267241**

In the December 12, 2003 Office Action, claim 56 was rejected under 35 U.S.C. §103(a) as being unpatentable over JP `273, and further in view of JP 2001-267241 (hereinafter “JP `241”).

Applicants traverse such rejection.

JP `241 relates to the cleaning of a CVD processing chamber using a generated interhalogen reactive gas. To generate the interhalogen reactive gases, a mixture of gases are introduced into a heated reactor. Mass flow controllers (MFC) are inserted between the gas sources and the heated reactor so that the ratio of fluorine to other halogens may be adjusted to optimum levels during generation and subsequent cleaning.

According to the Examiner:

“the invention as a whole would have been obvious to one having ordinary skill in the art . . . because one skilled in the art would have been motivated to have modified the method of JP `273 . . . wherein said holding chamber is equipped with a mass flow controller because the selection of old parts to operate in new environments in order to achieve the same results was held to have been obvious. *In re Ross* [sic], 105 U.S.P.Q. 237.”<sup>2</sup>

Applicants vigorously disagree.

There is no suggestion or motivation in JP `273 or JP `241 to combine the two references. As such, the Examiner has failed to establish a *prima facie* case of obviousness.

In the present case, applicants are claiming that the holding chamber, which is interposed between the mixing chamber and the processing chamber, is equipped with a MFC, which is interposed between the holding chamber and the processing chamber (see Figure 2 of the instant application). The MFC serves to achieve reproducible delivery of F radicals and/or XF<sub>n</sub> compounds into the processing chamber. (see instant application, paragraph [0028]).

In contrast, the MFCs **38a**, **38b** and **38c** of JP `241 are situated between the gas sources **32**, **34** and **36** and the piping member **42**, as shown in Fig. 1 of JP `241, recreated hereinbelow for ease of reference.

---

<sup>2</sup> The citation is *In re Rose*, 105 U.S.P.Q. 237 (CCPA 1955).

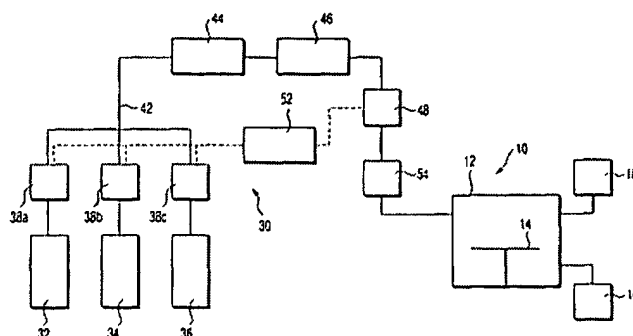


Fig. 1 of JP '241

As stated in JP '241, the reactive gases formed in the heated reactor **44** flow through an analyzer **48**, which communicates with a main controller **52**. If the reactive gas ratio of fluorine to other halogens varies from a pre-determined value, the main controller **52** uses the MFCs **38a**, **38b** and **38c** to adjust the amount of gas delivered from gas sources **32**, **34** and **36** to the heated reactor **44**, thereby returning the reactive gas ratio to the pre-determined value.

The Examiner is respectfully reminded that:

“[t]he mere fact that a worker in the art **could** rearrange the parts of the reference device to meet the terms of the claims . . . **is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason** for the worker in the art, **without the benefit of the appellant's specification**, to make the necessary changes in the reference device.” *Ex parte Chicago Rawhide Mfg. Co.*, 223 U.S.P.Q. 351, 353 (B.P.A.I. 1984).

In the present case, the cited references do not provide a motivation or reason for equipping applicants' holding chamber with a MFC. Instead, the Examiner is merely reconstructing applicants' claimed invention in light of applicants own specification, without any suggestive basis in the cited references themselves.

Because there is no motivation, suggestion or basis in JP '273 or JP '241 to combine the two references, there is no *prima facie* case of obviousness of applicants' claim 56.

Accordingly, applicants respectfully request withdrawal of the §103 rejection of claim 56 based on JP '273 over JP '241.

#### **Fees Payable for Added Claims 69-70**



One (1) independent and one (1) dependent claim have been added herein. Because two (2) dependent claims have been canceled, an added claims fee of  $(1 \times \$86.00) = \$86.00$  is due for the conversion of a dependent to an independent claim.

The total fee of \$86.00 is authorized to be charged in the attached credit card authorization form. Authorization also is hereby given to charge any deficiency in applicable fees for this response to Deposit Account Number 08-3284 of Intellectual Property/Technology Law.

### CONCLUSION

Based on the amendments made herein and the foregoing remarks, claims 32-46, 48-53, 55-62 and 66-70 are now in form and condition for allowance. The Examiner therefore is respectfully requested to reconsider and allow such claims.

Respectfully submitted,



---

Steven J. Hultquist  
Reg. No. 28,021  
Attorney for Applicants

**INTELLECTUAL PROPERTY/  
TECHNOLOGY LAW**  
P.O. Box 14329  
Research Triangle Park, NC 27709  
Phone: (919) 419-9350  
Fax: (919) 419-9354  
Attorney File No.: 2771-506